New York State Integrated Pest Management Program
Cornell Cooperative Extension

TREE FRUIT

Bacterial Canker of Stone Fruit

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Bacterial canker of stone fruit occurs worldwide and is caused by *Pseudomonas syringae* for which distinct pathovars are known and associated with host range. In New York, the disease predominantly affects sweet cherry, but can also occur on tart cherry, plum, prune, peach and apricot. Young, newly planted trees are at greatest risk of damage from bacterial canker infections because of the disease's impact on buds and shoots. However, any age tree can become infected and show symptoms.

Causal Agent

Pseudomonas syringae bacteria survive on the leaf surfaces of many plant species, including weeds. The over 50 pathovars of *P. syringae* can cause disease on over 180 plants – annuals, perennials, fruits, vegetables, and ornamentals. They readily colonize plant surfaces, making it tricky to isolate and characterize the actual pathogen from diseased plant tissue. The two main pathovars (pv.) that infect stone fruits in New York are *P. s.* pv. *syringae* and *P. s.* pv. *morsprunorum*.

Symptoms and Signs

Pathovars *syringae* and *morsprunorum* can invade buds, twigs, and branches systemically without causing symptoms, can incite mild symptoms including dead buds, twig cankers, leaf spots, flower and fruit lesions, or can cause severe symptoms of collapse and death of the above-ground parts of the tree (Fig. 1), including the suckers.

Dead buds and spurs fail to grow due to infections originating through leaf scars. Young shoots emerging from infected buds may develop dead areas that coalesce and blight the shoot (Fig. 2). Blighted shoots may lead to colonization of shoots and cankers on young wood. Cankers, may also form on shoots under dead, infected buds and spurs or via pruning wounds. Often, but not always, gum is produced by the tree in response to cankers. Gummosis (Fig. 3), a very noticeable symptom, can be caused by other pests such as borers or be a response to wounding during pruning.

Leaf spots can occur when bacteria invade leaves during rainy, cool and humid weather. On leaf spots, look for a shiny, varnish-coated appearance from bacterial exudate that has dried on the leaf. Leaf spots may drop out leaving shot hole symptoms. Economic injury is caused mostly by the cankers, which destroy shoots and limbs and by systemic infections that can kill trees.

Disease Cycle and Epidemiology

Several factors promote disease severity and symptom expression, including poor nutrition, plant parasitic nematodes, and sandy soils. Climatic factors such as late spring frosts and growing seasons with frequent rainfall, high humidity, and cool temperature favor the disease. The pathogen invades the tree systemically via leaf stomates and leaf scars from which it moves into buds and twigs. It may also enter through pruning wounds and frost-damaged tissues.

The bacteria live on plant surfaces, such as buds, shoots and leaves, as epiphytes. These surface populations increase during cool, wet weather reaching highest numbers during fall, late winter and early spring. In autumn, as leaves drop off the tree, the bacteria enter the vascular tissue of the exposed leaf scars and

Figure 1. Damage to a sweet cherry tree from bacterial canker caused by *Psuedomonas syringae* pv. *morsprunorum.* Trees were pruned shortly before a drenching rain.

Figure 2. Bacterial canker infection caused by *Pseudomonas syringae* pv. *syringae* on a sweet cherry shoot following a late spring freeze event.

Figure 3. Gummosis, often associated with bacterial canker infections of stone fruit trees, is a general host defense response to injury. Bacterial canker infections may occur without the presence of gummosis, particularly in trees of low vigor.

Figure 4a. A branch pruned in August after harvest showing little to no progression of bacterial canker down the stub.

Figure 4b. A branch pruned in March showing progression of bacterial canker down the stub and into the uppermost, young lateral.

move into the buds where they overwinter. In spring, infected buds that have died will fail to grow, but some buds may remain viable and as these begin to grow, the young, emerging leaves and flowers may succumb to infections. Cankers can develop under dead buds. During spring, bacteria can gain entry into branches and scaffold limbs via pruning wounds, especially if pruning is done during cool, rainy weather.

Management

Because the bacteria can live on the outer surfaces of the tree, orchard management must avoid predisposing factors, which include freeze prone areas, sandy soils, poorly drained waterlogged soils, or prolonged periods of drought. The most important aspect of managing bacterial canker is to select and prepare an optimal site for growing cherries and to provide them with best cultural practices.

Copper sprays will reduce the epiphytic populations. Apply these to correspond with 20% leaf drop and 80% leaf drop in autumn. One (no more than three) late dormant applications will further reduce the bacterial populations on the trees. However, copper sprays will be ineffective if bacteria in your orchard are resistant to copper.

It is best to prune cherries after harvest (Figs. 4a and 4b) when weather is dry and no rain is forecast. Leave a 6-inch-long pruning stub to dead end the infection and distance it from the main trunk and scaffolds.

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